SAFETY CONSCIOUSNESS - AN EVALUATION

BY STANLEY M. WALKER

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INTRODUCTION

Safety consciousness is not a constant for which a specific value can be assigned, but is a variable, which is frequently intangible. Its evaluation is not simple.

We all know that safety consciousness is the most potent factor in the prevention of accidents. Safety consciousness may be defined as awareness of hazard and alertness to danger, which controls every action of an individual through his desire to remain alive and uninjured.

Many firmly believed that at least 80 or even 90 percent of all injuries can be traced to someone's lack of safety consciousness - usually, but not always, the injured person. If this is true, the frequency of injuries is a good indicator of the safety consciousness of the workers involved.

If a man takes chances, indulges in unsafe practices, uses an improper tool, or leaves an open hole unguarded, he is not safety conscious. Few, if any, men are completely oblivious of their safety at all times or have no safety consciousness, but many persons manifest it intermittently. Some approach a close-clearance haulageway with great caution, but will enter a shop and grind a lathe tool without using goggles; others wear their goggles constantly but will "dress" a belt at the pinch point. Such men I call "periodics" - they are accident-prone.

Although the safety consciousness of workers may be evaluated approximately by the frequency of their injuries, we are specifically interested in finding why some are safety conscious and others are not. Worthy of investigation is the fact that the workers at two comparable plants in the same area show wide divergence in the frequency of injuries. Does a relationship exist between the safety consciousness of direct supervisors and workers and top management and workers? If there is such a definite relationship, an attempt should be made to find a yardstick to measure safety consciousness and to determine how it can best be used to benefit the relationships and protect workers from injury.

Top management is responsible for the safety of every worker; it controls local safety policies, thereby acknowledging the responsibility. Sometimes a company will employ a safety engineer and then burden him with so much personnel and first-aid work that he rarely has an opportunity even to inspect the plant or arrange programs and meetings or provide leadership for the many activities so essential to a good safety job. He is a safety engineer in name only, and such procedure reflects the safety consciousness of the entire management.

Safety consciousness must be comprehensive. It must reach every corner of the plant; it must be evident at all meetings; and, most of all, it must be so instilled that all men in supervisory positions will set good examples in safety to the men under them. Setting a good example is a potent factor in reducing accidents and is proof of the safety consciousness of the supervisor.

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Some men, personally safety conscious, fail to see the need of inspiring the men under them to a keen alertness to danger or lack the ability to do so. Some men, who have made oral or written dissertations on safety, fail to take any active part in the safety programs at properties over which they have jurisdiction. This might be termed lip service to safety. Some superintendents and managers believe that safety is solely the job of the safety engineer or, lacking a safety engineer, of the foreman, but definitely not a part of their jobs.

You can't buy safety. Hiring a safety engineer does not relieve a manager or superintendent of responsibility for the safety of his men or plant any more than hiring a blasting foreman relieves the quarry superintendent of the responsibility of "pulling" the burden of a blast to the toe of the bank, or employing a chemist relieves a manager of the responsibility of supplying the demand for "high early" when "high early" is at a premium.

So much for what safety consciousness is and is not.

The frequency of accidents has a definite, rather precise relationship to the safety consciousness of management as well as workers. This relationship forms a definite pattern, and the well-being of all workers is affected thereby. The factor of luck may seem to distort the pattern at times, but over long periods or among a number of comparable companies, the pattern remains unchanged.

SOURCE OF DATA

Over the past 5 years it has been my privilege to visit, inspect, study accident records, and conduct classes in accident prevention at the properties of 62 companies in 3 western, 3 eastern and 4 southern States. Annual employment of these companies ranges from 100,000 to 4,000,000 man-hours of working time, of which more than half worked approximately one half-million man-hours. Forty percent were cement plants and quarries.

From the information obtained, I have constructed a chart tabulating a variety of data pertinent to safety consciousness. The data obtained from these companies are confidential, of course, and as certain records could be identified, especially by other companies in the same area, the chart will not be made public, but much information from it can be shown without embarrassment to anyone.

THE MASTER CHART

The master chart contains the following information:

1. Company; designated by number only.

2. Accident frequency:
   Number of lost-time injuries per million man-hours worked.

3. Accident severity:
   Number of days lost per thousand man-hours worked.

4. Man-hours worked annually:
   The man-hours worked ordinarily reflect the size of an operation, diversification of its plants, multiplicity of its equipment and exposure to hazard. There are a few exceptions.

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5. Number of recommendations made for plant, quarry, or mine improvement per 100,000 man-hours worked annually, thus reducing the number of recommendations made to comparability by size.

6. Plant protection based on the number of recommendations made:
Very good - Less than 1 recommendation per 100,000 man-hours.
Good - 1 or 2 recommendations per 100,000 man-hours.
Fair - 3 or 4 recommendations per 100,000 man-hours.
Poor - 5 or 6 recommendations per 100,000 man-hours.
Very poor - Over 6 recommendations per 100,000 man-hours.

7. Who pays for attendance at accident-prevention classes?
Held on company's time entirely.
Held on the men's time entirely.
Held half on the men's time and half on the company's time.

8. Work practices and safety rules as follows:
Very good - Safety rules printed in booklet form and familiarity with them required; infractions of the rules resulting in less than 5 percent of the total injuries.
Good - Safety rules printed, but laxity in distribution and familiarity; infractions resulting in 5 to 10 percent of the injuries.
Fair - No printed rule books, but safety rules publicized in some manner; infractions resulting in 5 to 10 percent of the injuries.
Poor - Verbal safety rules only; infractions resulting in 10 to 20 percent of the injuries.
Very poor - Reliance on State laws and the unwritten rule; infractions resulting in more than 20 percent of the injuries.

Although precision is impossible in the foregoing classification, a surprising number of companies fall into the pattern of increased infractions of the printed or common-sense rule as publicity of these rules decreases, and the figures given for each classification have few exceptions.

9. Number eligible for instruction in accident prevention:
Companies usually compiled a list of their personnel from foreman up to and including the top operating officials, and included others whom they considered should take the course; this list constituted the eligibles.

10. Number of the eligibles fully trained and receiving certificates.

11. Number partly trained due to absenteeism.

12. Participation of top management in classes:
The highest ranking official attending the class is shown, together with the number of officials above him in rank who failed to attend. The attitude and activity of the top official attending were noted as:

a. Leading in discussions, asking questions, discussing recommendations, and in other ways indicating his safety consciousness and interest.

b. Not leading but showing good interest in safety work.

c. Nonparticipating and interest apparently lacking.

d. Presence detrimental to class discussion.

The attitude of the top men attending classes is reflected surprisingly in the attitudes of the remaining participants, such as in attendance, apparent interest, asking of pertinent questions, participating in discussions, and, in a very few instances, heckling. If the top men who attend are indifferent, the foremen feel free to raise extraneous points, quibble over nonessentials, and even walk in and out of sessions as the "spirit moves them."

If the highest-ranking man is really safety conscious, he will be keenly interested, take a leading part in discussions, and bring up questions pertinent to plant or practice betterment; the other men in the class almost invariably will reflect some of his enthusiasm for safety. There is no better way to instill safety consciousness in the foremen and workmen.

At the mines and beneficiation plants of a Pennsylvania company, ten 2-hour sessions were held in the afternoons and similar ones in the evenings on the same subjects. The general manager not only attended all 20 sessions and took a leading part, but required the assistant manager and 3 superintendents to attend all 20 sessions. The classes were considered very successful, and many recommendations were discussed and adopted during the sessions. Not many top men take their safety duties so seriously; it is noteworthy that the accident-frequency rate of this company is consistently one of the lowest in the country among companies with similar operations.

An example of the opposite attitude is a company whose manager expressed the need for the Bureau's service and his appreciation of the opportunity and seemed very enthusiastic. This proved to be lip service only, because when the classes began about 3 weeks later, only two men attended - boys just out of school - in clerical positions. When questioned as to why, he expressed regrets but said he was just too busy to be bothered with classes just then. The frequency rate at this company is over 200 - one of the worst I have found.

It is not difficult to evaluate the attitude of officials attending the classes, and the companies have been rated accordingly.

DEVELOPMENT OF THE PATTERN

The master chart discloses some rather enlightening facts that I believe may be considered fairly conclusive for the 62 companies in the study and discloses the behavior pattern of workers in relation to safety consciousness.

Most of the 62 companies are in the average or middle-size group, as shown by table 1; the information was taken from the master chart.

TABLE 1. - Companies studied according to man-hours annual employment

No. companies	Man-hours employment
5...............	100,000 to 250,000
17...............	250,000 to 400,000
21...............	400,000 to 750,000
14...............	750,000 to 1,250,000
5...............	1,250,000 or more
62	

Neither extremely small nor exceptionally large companies are included, and the cross section therefore contains essentially average size companies. Table 2 shows that 6 companies, all in the middle-group range, were free of accidents for the year before the survey; 14 companies had frequency rates above 50; those of 2 companies exceeded 200. The group also shows a wide diversification of frequency range, but neither the very safe nor the very unsafe predominate, emphasizing the fact that the survey covers average properties.

TABLE 2. - Classification of companies according to injury-frequency rates

Frequency rates							Total companies
0.0	0.0-2.5	2.5-5	5-10	10-25	25-50	Over 50	
-	-	-	-	-	3	2	5
2	-	4	2	3	1	5	17
3	2	3	3	3	2	5	21
1	2	1	-	7	1	2	14
-	-	-	3	1	1	-	5
6	4	8	8	14	8	14	62

Table 3 shows the classification, by frequency range, of safety judged by plant protection.

TABLE 3. - Plant protection according to number of recommendations made

Frequency range	Very good	Good	Fair	Poor	Very poor	Total companies
0.0	-	5	1	-	-	6
0.0 to 2.5	1	2	1	-	-	4
2.5 to 5.0	2	6	-	-	-	8
5.0 to 10.0 ...	-	5	3	-	-	8
10.0 to 25.0 ..	-	5	7	2	-	14
25.0 to 50.0 ..	1	1	2	4	-	8
Over 50	-	1	4	7	2	14
	4	25	18	13	2	62

Some unusual facts are shown in table 3. None of the accident-free plants are classed as "very good." Two-thirds of the "good" plants are in the 2.5 to 25.0 frequency range. The same number of plants in the 10.0 to

25.0 frequency range and the accident-free plants were classed as good. The lack of protection shows in the high-frequency plants, as would be expected. This table indicates that something very definite is involved, other than plant protection, if accidents are to be prevented. The pattern is beginning to appear. Table 4 shows class attendance according to whose time was involved.

TABLE 4. - Attendance according to whose time was involved

Classes held on:	Number of companies	Percent of eligibles attending	Percent completing	Average accident frequency of group
Man's time.............	21	87.7	70.5	48.7
Half on men's and half on company's time....	19	95.4	87.5	27.8
Company's time.........	22	96.8	84.4	23.5

According to table 4, the pattern is taking definite shape. The acceptance by a company of this free service of the Bureau of Mines as an aid in the prevention of accidents indicates the belief that benefits are likely to result. The managements of 21 companies did not believe it was important enough to risk interruption of normal supervision and production and requested the supervisors to take the course on their own time; although they represented a salaried group at most companies, only 87.7 percent of those eligibles took the course, and only 70.5 percent completed it. Attendance at 80 percent of the scheduled classes is considered completion. Note that the average accident frequency rate was 48.7 for this group.

Nineteen companies started classes 1 hour before and continued 1 hour after a change in shifts; the outgoing-shift foremen left their work 1 hour early and remained 1 hour afterward, and the incoming-shift foremen reported 1 hour earlier than usual. The managements of those companies indicated their safety consciousness and belief in such safety work by paying for half of their foremen's time; 95.4 percent of those eligible took the course, and 87.5 percent completed it. Note the lower frequency rate of 27.8 for this group. The high percentage of men in this group completing the course resulted from the practice of some companies that paid a bonus to those who attended and received certificates.

The management of 22 companies considered accident-prevention education to be of such importance as to arrange for holding the classes on company time, curtailing normal supervision, and risking possible interruption to production. The percentage of eligibles attending was 96.8, and 84.4 percent completed the course. The average frequency rate for this group is 23.5, the lowest of the three groups.

The pattern appears to indicate that, as increased importance is attached to accident-prevention education, even to utilization of production time for it, the frequency of accidents actually falls, group by group. To express this another way, perhaps the management of those companies enjoying low-frequency rates realizes that company time devoted to safety reaps a rich reward, whereas those with high frequencies still believe that safety should be acquired off-the-job by their foremen. The chart appears to emphasize a possible error in such thinking.

Table 5 is an analysis of the attitude of top officials toward actual participation in safety and accident-prevention instruction as outlined above.

TABLE 5. - Attendance and attitude

	Number of companies	Percent of eligibles attending	Percent completing	Average frequency of group
Top official attending and leading.....................	25	97.8	89.1	5.26
Top official attending but not leading.....................	10	98.2	81.7	22.42
Top official not attending but next official leading.......	11	93.3	82.2	34.93
Top 2 men not attending and not leading.................	10	87.4	73.8	71.70
Top 3 men not attending and not leading.................	6	62.3	33.5	128.70

Examination of table 5 will show the pattern to be virtually complete. At 25 companies the highest-ranking officials, usually a general manager or plant manager, took a keen interest, attended all sessions, and took advantage of the classes to instill into their supervisors some of their own safety consciousness and proved by their actions that "Safety First" was not only a slogan at their plants but an actuality and of paramount importance. Under such leadership, superintendents and foremen are most likely to replect the enthusiasm and safety consciousness of the "boss," and they, in turn, find it easy and natural to instill safety consciousness into the workers. This has been borne out by an average frequency rate of 5.26 for these 25 companies.

On the other hand, at the 16 companies comprising the last two groups of table 5, no high-ranking official attended the classes; that is, neither manager, assistant manager, nor superintendent considered safety instruction or classes germane to their duties, and usually foremen alone attended. No better way could be found to emphasize to a group of foremen the lack of active safety consciousness among the higher-ups. Many officials will deny this vehemently, but no matter how safety conscious they consider themselves nor how much they believe in safety work, if they fail to show it by active participation in group meetings, the foremen can hardly be blamed for thinking: "If the boss doesn't care about safety, why should I?" The tell-tale result is shown in the table - an average frequency rate of 100 for the two groups and only 55 percent of the eligibles completed the course of instruction.

There were, of course, some instances where the highest-ranking official could not attend the classes for valid reasons, such as illness, but in most of these the next-ranking official took a leading part.

The master chart verifies perdictable results as follows:

1. At a well-protected plant with safety conscious employees, a frequency rate of less than 2.5 may be expected.

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2. Even at a poorly protected plant, if **all** employees and officials are safety conscious, frequency rates of 2.5 to 10.0 may be attained.

3. At a well-protected plant, if the workers or officials are not very safety conscious, frequency rates of 10.0 to 20.0 nearly always result.

4. At a poorly protected plant, if safety consciousness is lacking, frequency rates ranging from 20 to 200 are almost certainties.

A certain plant in the South has operated almost 1,900 days without a lost-time injury, probably a world's record for this type of plant. The average frequency rate for all plants in this industry is in the 40's. Quite a record, but it falls perfectly into the pattern. The manager, who is exceptionally safety conscious, was first employed by the company as the safety engineer and has been constantly "breathing safety down the necks" of all employees as he rose from safety engineer to general manager and vice-president. Safety consciousness is apparent in every man in the plant; therefore, a world's safety record is not surprising. It is reported that the company's profits have increased as its frequency rate has declined.

SUMMARY

A summary of these findings is simple.

Few men are inherently safety conscious.

The behavior pattern of the safe worker is merely safety consciousness in practice.

If safety consciousness is not inherent, it must be derived from others, and ordinarily the others are the workers' supervisors.

The supervisors, in turn, look to their superintendents to provide good examples of safety consciousness.

If the worker is to avoid injury, the top officials must point the way. You can't buy safety, and lip-service to safety doesn't prevent injuries.

To join the 1,000-day club, safety consciousness must be stimulated from the highest-ranking official to the least skilled worker on the payroll, every day in the year, and every hour of the day.

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